

WHAT IS CLAIMED IS:

1. An interventional device for introduction through a vascular penetration to a treatment site in a vessel comprising:
  - a catheter shaft having a proximal extremity, a distal extremity and an interventional element coupled to the distal extremity; and
  - a guidewire tube having a proximal end, a distal end and a guidewire lumen therebetween configured to slidably receive a guidewire, the distal end being coupled to the distal extremity of the catheter shaft and the proximal end being separate from the catheter shaft;

wherein the proximal extremity of the catheter shaft and the guidewire tube each have a length sufficient to extend to the vascular penetration when the interventional device is positioned at the treatment site.
2. The interventional device of claim 1 further comprising a collar positionable in the vascular penetration and having at least one passage therein configured to slidably receive the proximal extremity of the catheter shaft and the guidewire without substantial leakage of blood therethrough.
3. The interventional device of claim 2 wherein the collar is positionable through a hemostatic device in the vascular penetration, the collar having an exterior surface configured to seal within the hemostatic device.
4. The interventional device of claim 2 wherein the collar comprises a seal in communication with the at least one passage for inhibiting leakage of blood around the proximal extremity.
5. The interventional device of claim 2 wherein the collar comprises a first passage for receiving the catheter shaft and a second passage for receiving the guidewire tube.
6. The interventional device of claim 1 wherein the guidewire tube comprises a slit disposed longitudinally therein from a distal point less than about 50 cm from the distal end to a proximal point at least about one-half the length of the guidewire tube from the distal end.

7. The interventional device of claim 6 wherein the proximal point is within about 20 cm from the proximal end.

8. The interventional device of claim 6 wherein the proximal point is at the proximal end.

9. The interventional device of claim 6 further comprising a wire guide positionable through the slit and operative upon the guidewire such that the guidewire is disposed in the guidewire lumen distal to the wire guide and disposed outside the guidewire lumen proximal to the wire guide.

10. The interventional device of claim 9 further comprising a collar having at least one passage configured to slidably receive the proximal extremity of the catheter shaft and the guidewire tube.

11. The interventional device of claim 9 wherein the wire guide is coupled to the collar.

12. The interventional device of claim 10 wherein the collar comprises a first passage for receiving the catheter shaft and a second passage for receiving the guidewire tube.

13. The interventional device of claim 9 wherein the wire guide comprises a distal opening, a proximal opening, and a guide passage therebetween, the distal opening being aligned with the guidewire lumen and the proximal opening being outside the guidewire tube when the wire guide is positioned through the slit.

14. The interventional device of claim 9 wherein the wire guide comprises a rounded or tapered distal edge configured to spread the slit in the guidewire tube.

15. The interventional device of claim 1 wherein the guidewire tube has a length of at least about 100 cm.

16. The interventional device of claim 1 wherein the guidewire tube is collapsible from an extended length to a collapsed length.

17. The interventional device of claim 16 wherein the guidewire tube has an accordion-like wall.

18. The interventional device of claim 16 wherein the guidewire tube comprises a series of generally conical segments connected by hinges, adjacent conical segments being pivotable toward and away from each other about the hinges.

19. The interventional device of claim 16 wherein the guidewire tube has a wall with a zig-zag cross-section.

20. The interventional device of claim 16 further comprising a collar having at least one passage configured to slidably receive the proximal extremity of the catheter shaft.

21. The interventional device of claim 20 wherein the proximal end of the guidewire tube is coupled to the collar such that moving the catheter shaft relative to the collar extends or retracts the guidewire tube.

22. The interventional device of claim 16 wherein the collapsed length is less than about 50% of the extended length.

23. The interventional device of claim 1 wherein the interventional element comprises a stent.

24. The interventional device of claim 23 wherein the interventional element comprises a plurality of stent segments.

25. The interventional device of claims 24 further comprising a sheath slidably disposed over the stent segments.

26. The interventional device of claim 25 wherein the sheath may be selectively positioned to deploy a first selected number of stent segments from the catheter shaft while retaining a second selected number of stent segments on the catheter shaft.

27. The interventional device of claim 1 wherein the interventional element comprises a balloon.

28. The interventional device of claim 27 further comprising a sheath slidably disposed over the balloon.

29. The interventional device of claim 28 wherein the sheath may be selectively positioned to expand a first portion of the balloon while constraining a second portion of the balloon.

30. The interventional device of claim 1 wherein the guidewire tube couples with the catheter shaft proximal to the interventional element and extends to a point distal to the interventional element.

31. A method of performing an intervention at a treatment site through a vascular penetration in a vessel, the method comprising:

providing an interventional device having a catheter shaft, an interventional element coupled to a distal extremity of the catheter shaft, and a guidewire tube having a distal portion coupled to the distal extremity of the catheter shaft and a proximal portion separate from the catheter shaft;

placing a distal end of a guidewire through the vascular penetration into the vessel;

inserting a proximal end of the guidewire through at least a portion of the guidewire tube;

positioning the interventional device through the vascular penetration; and

advancing the interventional device through the vessel to position the interventional element at the treatment site, wherein the guidewire is disposed within the guidewire tube between the vascular penetration and the interventional element when the interventional element is at the treatment site.

32. The method of claim 31 wherein the proximal end of the guidewire extends out of a slit in a wall of the guidewire tube.

33. The method of claim 32 wherein the slit extends from a point no more than 50 cm proximal to the interventional element to a point proximal to the vascular penetration when the interventional element is at the treatment site.

34. The method of claim 31 further comprising positioning a collar in the vascular penetration, the collar being slidably disposed over catheter shaft and the guidewire tube, wherein advancing the interventional device comprises moving the catheter shaft and guidewire tube relative to the collar.

35. The method of claim 34 wherein the collar has a wire guide that extends through the slit in the guidewire tube, and wherein moving the guidewire tube relative to the collar guides the guidewire into or out of the guidewire tube.

36. The method of claim 34 further comprising positioning a hemostasis device in the vascular penetration, the collar being positioned in the hemostasis device.

37. The method of claim 36 further comprising providing a hemostatic seal between the hemostasis device and the collar.

38. The method of claim 34 further comprising providing a seal in the collar to inhibit blood leakage from the vessel around the catheter shaft and guidewire tube.

39. The method of claim 31 wherein the guidewire tube is collapsible from an extended length to a collapsed length, the guidewire tube having the collapsed length when the guidewire is inserted therein and having the extended length when the interventional element is at the treatment site.

40. The method of claim 39 further comprising positioning a collar in the vascular penetration, the collar being slidably disposed over catheter shaft, wherein advancing the interventional device comprises moving the catheter shaft relative to the collar.

41. The method of claim 40 wherein the guidewire tube is coupled to the collar such that advancing the interventional device relative to the collar extends the length of the guidewire tube.

42. The method of claim 40 further comprising positioning a hemostasis device in the vascular penetration, the collar being positioned in the hemostasis device.

43. The method of claim 42 further comprising providing a hemostatic seal between the hemostasis device and the collar.

44. The method of claim 31 wherein the interventional element comprises a stent, the method further comprising deploying the stent at the treatment site.

45. The method of claim 31 wherein the interventional element comprises a plurality of stent segments, the method further comprising deploying a first selected number of the stent segments at the treatment site while retaining a second selected number of stent segments on the catheter shaft.

46. The method of claim 31 wherein the interventional element comprises a balloon, the method further comprising expanding the balloon at the treatment site.

47. The method of claim 46 further comprising expanding a first selected portion of the balloon while constraining a second selected portion of the balloon.

48. The method of claim 31 further comprising withdrawing the interventional device from the vessel, wherein the guidewire exits the guidewire tube at locations progressively closer to the interventional element as the interventional device is withdrawn.

49. A method of performing an intervention at a treatment site through a vascular penetration in a vessel, the method comprising:

providing an interventional device having a catheter shaft, an interventional element coupled to a distal extremity of the catheter shaft, and a guidewire tube having a distal portion coupled to the distal extremity of the catheter shaft;

placing a distal end of a guidewire through the vascular penetration into the vessel;

positioning a proximal end of the guidewire through at least a portion of the guidewire tube such that the proximal end of the guidewire exits the guidewire tube at a point closer to a distal end of the interventional device than to a proximal end of the interventional device;

positioning the interventional device through the vascular penetration; and

advancing the interventional device through the vessel to position the interventional element at the treatment site, wherein the guidewire exits the guidewire tube

closer to the proximal end of the interventional device than to the distal end of the interventional device when the interventional element is at the treatment site.